

### **REMARKS**

Claims 1, 6, 7, 9, 11, 13, 15, 17, 18, 24, 25, 29, 30, 32, 36, 39, 43, 51, 52, 92, 93, 97, 98, 103, 112, and 114 are pending in this application. All claims are rejected. Claims 24, 29, and 103 are canceled without prejudice, and new claim 116 is added as shown above. Claims 1, 13, 15, 24, 29, 103, 112, and 114 are amended to clarify what is claimed. Applicants submit that no new matter is added as support for the amendments and new claim exists in the specification and claims as originally filed.

For the purpose of indicating proper support for the amendments to the application as filed, reference is made to the application as originally filed, using the notation [page No.; first line - last line], e.g. [7; 14-23].

Applicants submit that written description support exists for new claim 116 in claim 5 as originally filed and in the specification at [13; 30] and [15; 27].

An obvious error has been corrected in claim 1. In the originally filed application there was an error in claims 1 and 2 where the term “*co-solvent*” should clearly be replaced with the term “*reactant*”, cf. original claims 1 and 2, [41; 11 and 23] because “the co-solvent” is undefined in these claims, and it does not make sense that the reactant does not take part in the formation of the compound. This is also quite clear from the originally filed description [13; 10 and 24]. Furthermore, it is evident from the description, cf. [13; 30], [15; 27], [16; 20 and 26] and [18; 30-32], that the co-solvent is entirely optional to the super-critical solvent of the invention. This is also evident from the originally filed claims 5, 51, and 52, and their claim dependency.

The replacement of “*co-solvent*” with “*reactant*” is accordingly a correction of an obvious error that does not introduce new matter.

Claims 13 and 15 have also been amended: the term “*alternatively the substitution source*” has been inserted as in amended claim 1.

**Rejections under 35 U.S.C. § 112 ¶2**

Claims 1, 24, 29 and 103 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claim 1 has been amended in that the term “*and other such compound*” has been deleted. (Similar changes have been made in claims 112 and 114.)

Claims 24 and 29, and 103 have been cancelled.

Accordingly, Applicants respectfully request withdrawal of these rejections.

**Rejections under 35 U.S.C. § 102**

Claim 1 is rejected under 35 USC § 102 (a) as being anticipated by Reverchon et al. (“Synthesis of Titanium Hydroxide Nanoparticles in Supercritical Carbon Dioxide on the Pilot Scale”) and Merzbacher (US 6,296,678). *See* Office Action at 3.

Reverchon *et al.* teaches a method for producing titanium hydroxid (Ti(OH)<sub>4</sub>) under super-critical conditions established under the use of carbon dioxide; however, Reverchon does not teach the use of a solid reactor filling material as recited in claim 1. In the Office Action, it is alleged on page 4, middle paragraph, that the supercritical carbon dioxide-water mixture can function as “...*either the reactant or the solid reactor filling material,....*” Applicants respectfully disagree because the supercritical solvent is not in a solid form. Applicants submit that Reverchon does not anticipate claim 1, because Reverchon does not teach a method for

manufacturing a metal compound under supercritical conditions using a solid reactor filling material functioning as a promoting or catalytic agent for the formation of the resulting compound. Accordingly, this rejection should be withdrawn.

Merzbacher teaches a sol-gel for manufacturing an IR-active material. Applicants submit that Merzbacher teaches the use of supercritical carbon dioxide for the subsequent drying of the material, (as is acknowledged in the Office Action page 5, top paragraph, last sentence), not during the actual chemical reaction for making the material. Applicants respectfully submit that Merzbacher does not teach the use of a supercritical solvent to establish a contact between the metal- and/or semi-metal-containing precursor, or the substitution source, and the reactant, thus resulting in the formation of the compound as recited in claim 1. Accordingly Merzbacher does not anticipate claim 1, and this rejection should be withdrawn.

**Rejections under 35 U.S.C. § 103(a)**

Claims 1, 6, 7, 9, 11, 17, 18, 25, 30, 32, 39, 43, 51, 52, 92, 93, 97, 98, and 103 are rejected under 35 U.S.C. § 103(a) as obvious over Tillotson (US 2004/0060626). *See* Office Action at 6-11. Applicants note that which not specified by the Office Action, it appears dependent claims 30 and 32 are rejected over Tillotson in view of Reverchon. *See* Office Action at p. 8. Claim 103 has been cancelled, thereby rendering this rejection moot with respect to that claim.

The Tillotson disclosure relates to a method for producing a metal-oxide material using a sol-gel process; however, as acknowledged by the Office Action, Tillotson teaches a supercritical extraction using carbon dioxide subsequent to the reaction. *See* Office Action at 6 (bottom) and Tillotson at Fig. 1. Thus, the method of Tillotson is fundamentally different from the present

invention. Although the present invention may be implemented with a sol-gel process, it is an essential part of the present invention that a supercritical solvent be applied to establish contact between the metal- and/or semi-metal-containing precursor, or the substitution source, and the reactant (*i.e.* during the actual chemical reaction, not afterwards as an extraction step). Applicants respectfully submit that Tillotson does not teach or suggest using a supercritical solvent during the reaction. Moreover, Tillotson does not teach or suggest the use of a solid reactor filling material as recited in claim 1.

Applicants respectfully submit that the Office Action does not establish a *prima facie* case of obviousness with regard to the rejected claims for at least the reason that Tillotson (alone or in combination with Reverchon) fails to teach the subject matter of the rejected claims. Moreover, Applicants submit that there would not have been a reason for one of ordinary skill in the art to perform the sol-gel process under super-critical conditions, because Tillotson teaches the use of supercritical carbon dioxide only in a secondary drying step afterwards. Nor would one of ordinary skill in the art have had reason to additionally implement a solid reactor filling material for promoting or catalysing the chemical reaction. Accordingly, Applicants respectfully submit that the rejected claims are not obvious over Tillotson (or Tillotson in view of Reverchon).

Claims 1, 112, and 114 are rejected under 35 U.S.C. § 103(a) as obvious over Lauf (US 6,600,645). According to the Office Action, Lauf teaches a method of fabricating small, dense beads of metal oxide materials using a process that is further made enabled by a specific apparatus.

Applicants respectfully traverse this rejection for at least the reasons that Lauf does not disclose introducing (or a means for introducing) a supercritical solvent into a reactor. Indeed,

the word “supercritical” does not even appear in Lauf. Accordingly, Applicants respectfully submit that the Office Action does not establish a *prima facie* case of obviousness for at least the reasons that: 1) all of the elements of the rejected claims are not found in, or suggested by, Lauf, 2) the Office Action does not point to any reason why one of ordinary skill in the art would introduce a supercritical solvent in to the reactor of Lauf or include a means for introducing a supercritical solvent into the reactor of Lauf, and 3) there is, indeed, no reason why one of ordinary skill in the art in possession of Lauf would introduce a supercritical solvent into the reactor of Lauf or include a means for introducing a supercritical solvent into the reactor of Lauf, such that doing so would have been obvious to one of ordinary skill in the art. Accordingly, this rejection should be withdrawn.

Claims 13, 15, 24, 29, and 39 are rejected under 35 U.S.C. § 103(a) as obvious over Tillotson in view of Lauf. Applicants note that claims 24 and 29 are cancelled. With regard to claims 13, 15, and 39, Applicants respectfully submit that this rejection should be withdrawn for at least the reason that neither Tillotson nor Lauf teach introducing a supercritical solvent into the reaction, as recited in claim 1 (from which claims 13, 15, and 39 depend).

### **CONCLUSION**

The Examiner is respectfully requested to reconsider and withdraw the rejections, and to pass the claims of the present application to issue, for at least the above reasons. In the event any issues remain, Applicants would appreciate the courtesy of a telephone call to their counsel to resolve such issues and place all claims in condition for allowance.

Respectfully submitted,

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